Synthesis of plant cell wall oligosaccharides

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SYNTHESIS OF PLANT CELL WALL OLIGOSACCHARIDES

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Plant cell walls are structurally complex and contain a large number of diverse carbohydrate polymers. These plant fibers are a highly valuable bio-resource and the focus of food, energy and health research. We are interested in studying the interplay of plant cell wall carbohydrates with proteins such as enzymes [1-2], cell surface lectins, and antibodies [3-4]. However, detailed molecular level investigations of such interactions are hampered by the heterogeneity and diversity of the polymers of interest. To circumvent this, we target well-defined oligosaccharides with representative structures [5-6] that can be used for characterizing protein-carbohydrate binding. The presentation will highlight chemical syntheses of plant cell wall oligosaccharides from the group and provide examples from studies of their interactions with proteins.

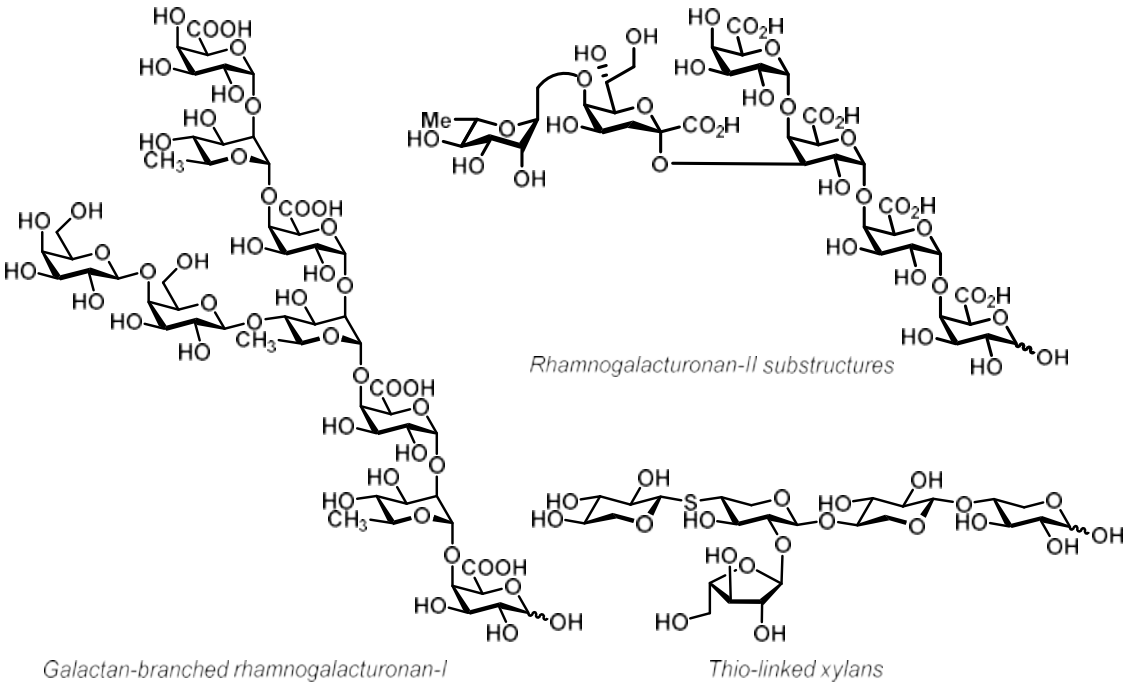

Figure 1. Examples of synthetic targets.

[1] Seyedarabi, A.; To, T. T.; Ali, S.; Hussain, S.; Fries, M.; Madsen, R.; Clausen, M. H.; Teixeira, S.; Brocklehurst, K.; Pickersgill, R. *Biochemistry* **2010**, *49*, 539-546.
[2] Liwanag, A. J. M.; Ebert, B.; Verhertbruggen, Y.; Rennie, E. A.; Rautengarten, C.; Oikawa, A.; Andersen, M. C. F.; Clausen, M. H.; Scheller, H. *Plant Cell*, **2012**, *24*, 5024-5036.
[3] Pedersen, H. L.; Fangel, J. U.; McCleary, B.; Ruzanski, C.; Ralet, M.-C.; Farkas, V.; von Schantz, L.; Marcus, S. E.; Andersen, M. C. F.; Field, R.; Ohlin, M.; Knox, J. P.; Clausen, M. H.; Willats, W. G. T. *J. Biol. Chem.* **2012**, *287*, 39429-39438.
[4] Andersen, M. C. F.; Boos, I.; Marcus, S. E.; Kracun, S. K.; Rydahl, M. G.; Willats, W. G. T.; Knox J.P.; Clausen, M. H. *Carbohydr. Res*. **2016**, *426*, 36-40.
[5] Zakharova, A. K.; Madsen, R.; Clausen, M. H. *Org. Lett.* **2013**, *15*, 1826-1829.
[6] Andersen, M. C. F.; Kracun, S. K.; Rydahl, M. G.; Willats, W. G. T.; Clausen, M. H. *Chem. Eur. J*. **2016**, *22*, 11543-11548.